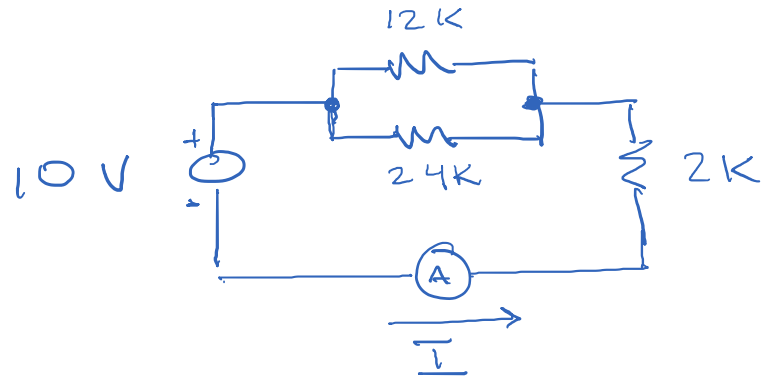
PHYS. 623 PS #1

1.

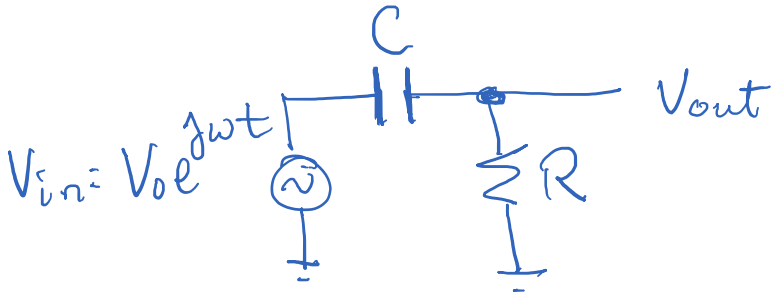


FIND CURRENT I

NOTE: 2K = 2000 Ω, ETC.

—(A)— IS AMMETER [POSITIVE CURRENT DEFINED IN DIRECTION OF ARROW]

2.



A. $\left|\frac{V_{out}}{V_{in}}\right| =$ _____

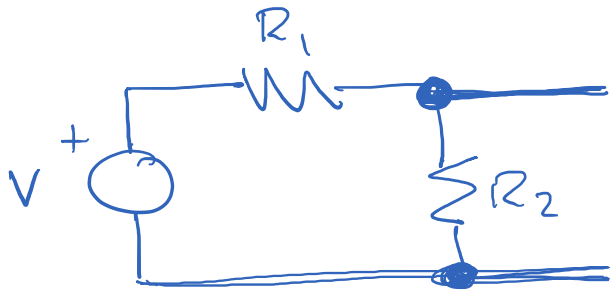
B. $\varphi\left(\frac{V_{out}}{V_{in}}\right) =$ _____

SOLVE AS FUNCTIONS OF ω

3. A. SKETCH $\left|\frac{V_{out}}{V_{in}}\right|$ VS. ω ON LOG-LOG PLOT FOR #2.

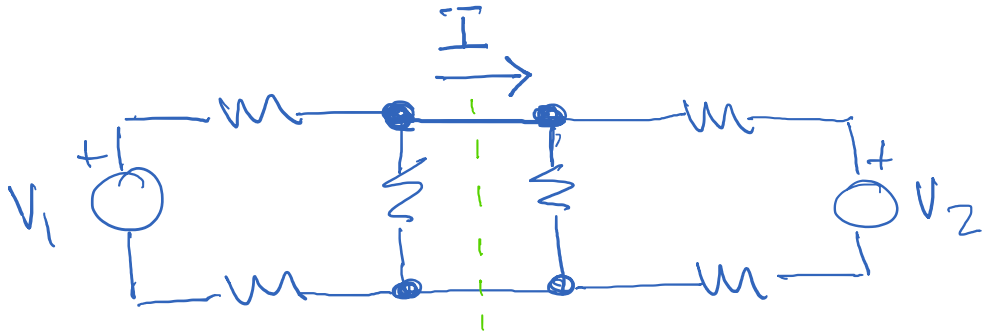
B. SKETCH φ VS. ω ON SEMILOG PLOT FOR #2.
(LOG IN ω)

4.



FIND THEVENIN EQUIVALENT

5.

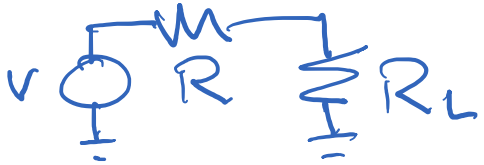


ALL RESISTORS HAVE VALUE R

FIND I IN TERMS OF V_1, V_2, & R.

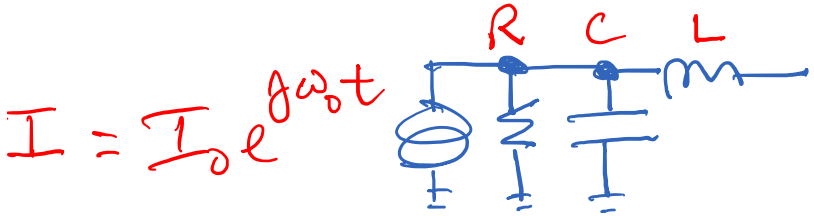
HINT: FIND THEVENIN EQUIVALENTS OF LEFT & RIGHT HALVES, THEN CONNECT THEM TOGETHER

6. CONSIDER A SOURCE WITH OUTPUT RESISTANCE R. FOR WHAT VALUE OF LOAD RESISTANCE R_L IS POWER TRANSFERRED TO LOAD MAXIMUM? WHAT IS MAX. POWER DELIVERED TO THE LOAD? SEE DIAGRAM.



7. <u>RESONANT IMPEDANCE TRANSFORMER</u>

CONSIDER THE CIRCUIT BELOW; HERE $\omega_0 \equiv \frac{1}{\sqrt{LC}}$.



EXPRESS AS A NORTON EQUIVALENT. WORK IN LIMIT $Q \equiv \frac{R}{\omega_0 L} = \omega_0 RC \gg 1$.

WRITE YOUR ANSWER IN TERMS OF I, R, AND Q.